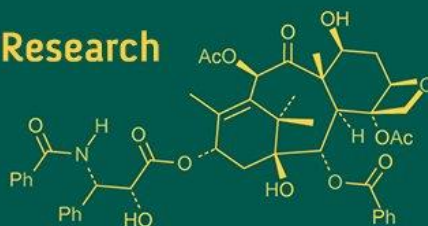


# International Journal of Advanced Biochemistry Research



ISSN Print: 2617-4693  
ISSN Online: 2617-4707  
NAAS Rating (2026): 5.29  
IJABR 2026; 10(6): 738-742  
[www.biochemjournal.com](http://www.biochemjournal.com)  
Received: 01-04-2026  
Accepted: 05-05-2026

**Kavita Khosla Chatley**  
Ph.D. Scholar, Department of  
Livestock Production  
Management, College of  
Veterinary Science and Animal  
Husbandry, Anjora, Durg,  
Chhattisgarh, India

**Dhirendra Bhonsle**  
Professor, Department of  
Livestock Production  
Management, College of  
Veterinary Science and Animal  
Husbandry, Anjora, Durg,  
Chhattisgarh, India

**Ranjana Sinha**  
Assistant Professor, Department  
of Livestock Farm Complex,  
Bihar Veterinary College, BASU,  
Patna, India

**Rupal Pathak**  
Assistant Professor, Department  
of Livestock Production  
Management, College of  
Veterinary Science and Animal  
Husbandry, Anjora, Durg,  
Chhattisgarh, India

**Nishma Singh**  
Assistant Professor, Department  
of Livestock Production  
Management, College of  
Veterinary Science and Animal  
Husbandry, Anjora, Durg,  
Chhattisgarh, India

**D Suryam Dora**  
Ph.D. Scholar, Department of  
Livestock Production  
Management, College of  
Veterinary Science and Animal  
Husbandry, Anjora, Durg,  
Chhattisgarh, India

**Kranti Sharma**  
Assistant Professor, Department  
of Panchagavya, College of  
Veterinary Science and Animal  
Husbandry, Anjora, Durg,  
Chhattisgarh, India

**Corresponding Author:**  
**Kavita Khosla Chatley**  
Ph.D. Scholar, Department of  
Livestock Production  
Management, College of  
Veterinary Science and Animal  
Husbandry, Anjora, Durg,  
Chhattisgarh, India

## Influence of dietary monensin sodium, yeast metabolites and neem (*Azadirachta indica*) leaf supplementation on faecal condition score of lactating Sahiwal cows

**Kavita Khosla Chatley, Dhirendra Bhonsle, Ranjana Sinha, Rupal Pathak, Nishma Singh, D Suryam Dora and Kranti Sharma**

DOI: <https://www.doi.org/10.33545/26174693.2026.v10.i6i.8737>

### Abstract

The present study was conducted to evaluate the effect of dietary supplementation of monensin sodium, yeast metabolites, and neem (*Azadirachta indica*) leaf on faecal condition score (FCS) of lactating Sahiwal cows. Twenty-four lactating Sahiwal cows were randomly allotted to four treatment groups with six animals in each group: T<sub>0</sub> (control, basal diet), T<sub>1</sub> (basal diet + monensin sodium @ 1 g/head/day), T<sub>2</sub> (basal diet + yeast metabolites @ 3 g/head/day), and T<sub>3</sub> (basal diet + neem leaf @ 200 mg/head/day). The feeding trial was conducted for 90 days. Faecal condition score was recorded at the beginning of the experiment and subsequently at 30-day intervals using a five-point scoring system. The mean faecal condition scores remained within the normal physiological range throughout the experimental period in all treatment groups. Analysis of variance revealed no significant ( $p > 0.05$ ) differences in faecal condition score among the treatment groups at any stage of the experiment. Likewise, within-group analysis showed no significant changes in faecal condition score over time. The mean FCS values ranged from 3.17 to 3.83, indicating satisfactory digestive function and adequate utilization of dietary nutrients. The maintenance of faecal consistency close to the ideal score suggests that supplementation of monensin sodium, yeast metabolites, and neem leaf did not adversely affect rumen fermentation, nutrient digestibility, or gastrointestinal health. It was concluded that dietary supplementation of monensin sodium, yeast metabolites, and neem leaf can be safely incorporated into the diets of lactating Sahiwal cows without causing undesirable alterations in faecal consistency or digestive status.

**Keywords:** Faecal condition score, monensin sodium, yeast metabolites, neem leaf, Sahiwal cattle, digestive health

### Introduction

Efficient nutrient utilization and optimal rumen function are essential prerequisites for sustaining milk production, animal health, and profitability in dairy production systems. The rumen ecosystem plays a central role in feed digestion through complex interactions among microorganisms, dietary substrates, and host metabolism. Any alteration in ruminal fermentation, microbial balance, or digesta passage rate may affect nutrient digestibility and subsequently influence productive performance. Therefore, evaluation of indicators associated with digestive efficiency is important for assessing the response of dairy animals to nutritional interventions. Among the various field-based indicators of digestive health, faecal condition score (FCS) has gained recognition as a practical, non-invasive, and economical tool for monitoring rumen function and feed utilization in cattle. Faecal consistency reflects the combined effects of dietary composition, nutrient digestibility, microbial fermentation, water balance, and rate of passage of digesta through the gastrointestinal tract. Consequently, changes in faecal characteristics may provide valuable information regarding the adequacy of nutritional management and digestive status of dairy animals. Petrovski *et al.* (2022) [12] described faecal scoring as an important “cow sign” that can be utilized for evaluating the quality of rumen fermentation, digestion, and nutritional adequacy in dairy herds. Similarly, Skidmore *et al.* (1996) [17] suggested that faecal consistency scoring can serve as a useful indicator of ration utilization and digestive

efficiency in dairy cattle. In recent years, considerable attention has been directed toward the use of feed additives capable of improving rumen fermentation and enhancing feed efficiency without adversely affecting animal health. Among these, monensin sodium, yeast-derived products, and phytogetic feed additives have emerged as important nutritional strategies for improving dairy cattle performance. Although these additives have been extensively investigated for their effects on milk production, feed efficiency, ruminal fermentation, and metabolic health, comparatively little information is available regarding their influence on faecal condition score, particularly in indigenous dairy breeds.

Monensin sodium is a polyether ionophore widely used in ruminant nutrition to modify rumen microbial populations and improve energetic efficiency. By selectively inhibiting gram-positive bacteria and favoring propionate-producing microorganisms, monensin alters ruminal fermentation patterns, increases glucose availability, and improves feed conversion efficiency (McGuffey *et al.*, 2001; Duffield *et al.*, 2008; Robinson, 2020) [9, 5, 15]. Recent studies have further demonstrated that monensin supplementation enhances milk production efficiency while maintaining favorable rumen function under modern feeding systems (Horst *et al.*, 2024) [6]. Because ruminal fermentation characteristics directly influence nutrient digestibility and digesta flow, monensin-induced changes in rumen metabolism may also be reflected in faecal consistency and manure characteristics.

Yeast metabolites and *Saccharomyces cerevisiae*-derived products are another group of feed additives extensively used to improve rumen stability and digestive function in dairy cattle. These products have been reported to stimulate beneficial microbial populations, enhance fiber degradation, improve dry matter intake, and support gastrointestinal health (Mahasneh *et al.*, 2023) [8]. In addition to their effects on rumen ecology, yeast fermentation products have been shown to modulate microbial populations in both the rumen and hindgut, improve epithelial barrier integrity, and reduce digestive disturbances associated with nutritional and environmental stressors (Chae *et al.*, 2024) [2]. Improvements in gastrointestinal function and nutrient utilization resulting from yeast supplementation may therefore influence faecal consistency, making faecal scoring a potentially useful indicator for assessing their biological response.

Interest in plant-based feed additives has also increased substantially because of concerns regarding antimicrobial resistance, consumer preference for natural products, and the search for sustainable livestock production systems. Neem (*Azadirachta indica*), a multipurpose medicinal plant widely distributed in tropical regions, contains numerous bioactive compounds including azadirachtin, nimbin, salannin, and flavonoids with antimicrobial, antioxidant, and anti-inflammatory properties (Kudom *et al.*, 2011; Ramesh *et al.*, 2011) [7, 14]. Neem leaves and their derivatives have been traditionally utilized in livestock feeding and have demonstrated beneficial effects on animal health and productive performance (Adhana *et al.*, 2023) [1]. Furthermore, neem-based feed resources have been explored as alternative nutritional supplements in dairy cattle because of their potential to influence digestive processes and nutrient utilization (Raj *et al.*, 2016) [13]. However, information regarding their effects on faecal characteristics and digestive indicators remains limited.

Despite substantial research on monensin sodium, yeast metabolites, and neem-based supplements, most studies have focused primarily on production performance, feed efficiency, rumen fermentation, immune function, and metabolic responses. Comparatively fewer investigations have evaluated faecal condition score as an indicator of digestive efficiency following supplementation with these feed additives. Moreover, comparative information regarding the effects of these additives under similar management conditions in indigenous dairy breeds such as Sahiwal cattle is scarce. Therefore, the present study was undertaken to evaluate the effect of dietary supplementation of monensin sodium, yeast metabolites, and neem (*Azadirachta indica*) leaf on the faecal condition score of Sahiwal cows and to assess their potential influence on digestive health and nutrient utilization.

## Materials and Methods

**Location of study-**The present investigation was conducted at the Bull Mother Experimental Farm (BMEF), College of Veterinary Science and Animal Husbandry, Anjora, Durg, Chhattisgarh, India. Durg is situated at an altitude of 317 m above mean sea level between 20°23' to 22°02' N latitude and 80°46' to 81°58' E longitude. The region has a dry tropical climate with hot summers (up to 45 °C), mild winters (minimum around 10 °C), and monsoon rainfall extending from July to September.

## Selection of animals and Experimental Design

Twenty-four lactating Sahiwal cows in early lactation were selected from the farm herd based on milk yield, parity (1<sup>st</sup> to 6<sup>th</sup> lactation) and body weight (350-400 kg). Animals were distributed across treatments group to maintain uniformity of parity, Milk yield and physiological status. The cows were divided into four groups with six animals in each group:

**T<sub>0</sub> (Control):** Basal diet only

**T<sub>1</sub>:** Basal diet + Monensin sodium (Monovet 200) @ 1 g/head/day

**T<sub>2</sub>:** Basal diet + Yeast metabolites(celmanax) @ 3 g/head/day

**T<sub>3</sub>:** Basal diet + Neem (*Azadirachta indica*) leaf @ 200 mg/kg BW/day

All animals were dewormed with fenbendazole (7.5-10 mg/kg body weight) before the start of the experiment. The feeding trial was conducted for a duration of 90 days.

## Feeding and Management

All experimental animals were maintained under a uniform housing system (double-row conventional barn with concrete flooring). The diet consisted of green fodder (Hybrid Napier, Sudan grass, Berseem and local grasses as per availability), dry fodder and concentrate mixture. The concentrate contained 20% crude protein, 0.93% ether extract, 18% crude fiber and was offered during morning and evening milking. The animals were allowed routine grooming and had ad libitum access to clean drinking water.

## Faecal condition Score

Faecal consistency was evaluated to assess the digestive status and rumen function of lactating Sahiwal cows under different dietary treatments. Fresh faecal samples were

collected manually by rectal evacuation immediately after milking. Sampling was carried out at the beginning of the experiment (Day 0) and subsequently at monthly intervals throughout the experimental period. Faecal consistency was assessed visually using a five-point scoring system as described by Skidmore *et al.* (1996) [17] with slight modifications. For uniform evaluation, fresh faeces were dropped from a height of approximately 1 m onto a clean concrete floor and observed for consistency, shape, and splatter characteristics. Scores ranged from 1 to 5, where Score 1 represented very liquid faeces and Score 5 represented extremely firm and dry faecal balls. A score of 3 was considered the optimum faecal consistency, indicating adequate digestion and a balanced diet.

### Statistical Analysis

Data on body condition score were analyzed using SPSS 26.0 software (SPSS Inc., USA). One-way analysis of variance (ANOVA) was applied to compare treatment means at each observation period as described by Snedecor and Cochran (1994) [18]. The means were compared using a Tukey test LSD and  $P \leq 0.05$  was considered statistically significant.

### Results

The faecal condition score (FCS) of lactating Sahiwal cows under different dietary treatments is presented in Table 1 and illustrated in Fig. 1 and 2. At the beginning of the experiment (Day 0), the mean FCS values ranged from 3.17 to 3.67 among the treatment groups, indicating comparable faecal consistency and digestive status of animals before the initiation of dietary supplementation.

During the experimental period, faecal condition scores remained within the normal range (3.17-3.83) across all treatment groups. On Day 30, the mean FCS values were  $3.50 \pm 0.43$ ,  $3.33 \pm 0.42$ ,  $3.83 \pm 0.48$  and  $3.67 \pm 0.49$  in the control ( $T_0$ ), monensin sodium ( $T_1$ ), yeast metabolites ( $T_2$ ) and neem leaf ( $T_3$ ) supplemented groups, respectively. At Day 60, the corresponding values were  $3.83 \pm 0.40$ ,  $3.67 \pm 0.33$ ,  $3.17 \pm 0.31$  and  $3.83 \pm 0.48$ . On Day 90, mean FCS values were recorded as  $3.50 \pm 0.34$ ,  $3.67 \pm 0.33$ ,  $3.33 \pm 0.42$  and  $3.17 \pm 0.31$  in  $T_0$ ,  $T_1$ ,  $T_2$  and  $T_3$  groups, respectively.

Analysis of variance revealed that dietary supplementation with monensin sodium, yeast metabolites and neem leaf had no significant ( $p > 0.05$ ) effect on faecal condition score among treatment groups at any observation period. The corresponding between-group P values at Days 0, 30, 60 and 90 were 0.891, 0.880, 0.581 and 0.775, respectively.

Similarly, within-group analysis indicated that faecal condition score did not differ significantly ( $p > 0.05$ ) over the experimental period in any treatment group. The within-group P values for  $T_0$ ,  $T_1$ ,  $T_2$  and  $T_3$  were 0.861, 0.756, 0.704 and 0.747, respectively.

Overall, the faecal condition scores remained close to the ideal score of 3 throughout the study, indicating normal digestive function and adequate utilization of the experimental diets. The results suggest that supplementation of monensin sodium, yeast metabolites and neem leaf did not adversely affect faecal consistency or gastrointestinal health of lactating Sahiwal cows.

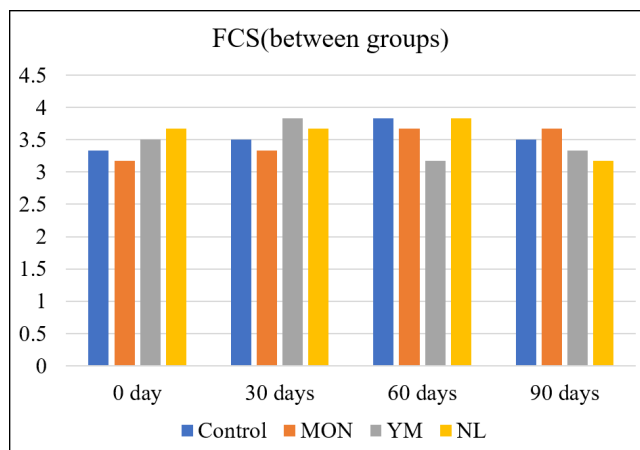


Fig 1: FCS of lactating Sahiwal cows under different dietary treatments

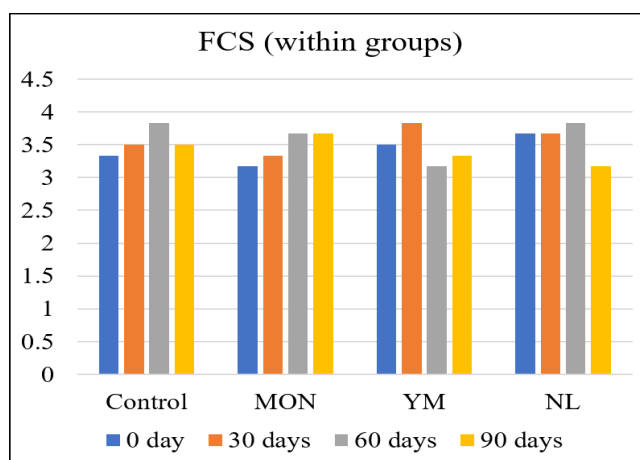


Fig 2: FCS of lactating Sahiwal cows within different dietary treatments

Table 1: Faecal condition score of lactating Sahiwal cows under different dietary treatments

| Days    | T <sub>0</sub> | T <sub>1</sub> | T <sub>2</sub> | T <sub>3</sub> | P value |
|---------|----------------|----------------|----------------|----------------|---------|
| 0       | 3.33±0.49      | 3.17±0.48      | 3.50±0.43      | 3.67±0.49      | 0.891   |
| 30      | 3.50±0.43      | 3.33±0.42      | 3.83±0.48      | 3.67±0.49      | 0.880   |
| 60      | 3.83±0.40      | 3.67±0.33      | 3.17±0.31      | 3.83±0.48      | 0.581   |
| 90      | 3.50±0.34      | 3.67±0.33      | 3.33±0.42      | 3.17±0.31      | 0.775   |
| P value | 0.861          | 0.756          | 0.704          | 0.747          |         |

### Discussion

The present study revealed that supplementation of monensin sodium, yeast metabolites, and neem (*Azadirachta indica*) leaf did not significantly affect the faecal condition score (FCS) of lactating Sahiwal cows throughout the experimental period ( $p > 0.05$ ). The mean faecal scores recorded across treatment groups ranged from 3.17 to 3.83,

which falls within the normal physiological range for dairy cattle and indicates balanced rumen fermentation, adequate nutrient digestion, and normal gastrointestinal function. Although minor numerical variations were observed among treatment groups, these differences were not statistically significant, suggesting that supplementation with the tested feed additives did not markedly influence digesta passage

rate or manure consistency.

Faecal condition scoring is widely recognized as a practical and non-invasive indicator of digestive health, rumen function, and nutritional adequacy in dairy cattle. Changes in faecal consistency may reflect alterations in ruminal fermentation patterns, dietary fiber utilization, passage rate of digesta, and nutrient digestibility. Consequently, faecal scoring has been extensively used as a field-based tool for evaluating digestive efficiency and the effectiveness of nutritional management practices in dairy herds (Skidmore *et al.*, 1996) [17]. Petrovski *et al.* (2022) [12] further emphasized that faecal consistency is an important “cow sign” that can be used to assess rumen fermentation quality, digestive function, and the adequacy of dairy cattle nutrition.

The absence of significant differences among treatment groups observed in the present study may be attributed to the fact that all experimental animals remained clinically healthy and were maintained on nutritionally balanced diets throughout the experimental period. Under such conditions, rumen fermentation and digestive processes are generally stable, resulting in faecal scores within the normal physiological range. Therefore, the opportunity for substantial treatment-induced alterations in manure consistency may have been limited. This finding suggests that the evaluated feed additives maintained normal digestive function without causing any adverse effects on gastrointestinal health.

Monensin sodium supplementation did not significantly affect faecal condition score in the present investigation. Monensin is a polyether ionophore that selectively inhibits gram-positive rumen bacteria and shifts ruminal fermentation toward greater propionate production, thereby improving feed efficiency and energy utilization (Russell and Strobel, 1989; Duffield *et al.*, 2008) [16, 5]. Recent studies have demonstrated that monensin enhances feed efficiency and milk production efficiency primarily through modifications in ruminal microbial activity and fermentation pathways rather than through changes in the physical characteristics of digesta (Robinson, 2020; Horst *et al.*, 2024) [15, 6]. Consequently, the lack of significant changes in faecal consistency observed in the present study is not unexpected and suggests that monensin improved rumen fermentation without disrupting normal digestive processes. Similarly, supplementation with yeast metabolites did not significantly influence faecal condition score during the experimental period. Yeast-derived products, particularly those originating from *Saccharomyces cerevisiae*, are known to stimulate beneficial rumen microorganisms, stabilize ruminal pH, improve fiber degradation, and support gastrointestinal health (Chaucheyras-Durand *et al.*, 2008; Desnoyers *et al.*, 2009) [3, 4]. Furthermore, yeast fermentation products have been reported to improve rumen and hindgut microbial balance, enhance epithelial barrier integrity, and reduce digestive disturbances under stressful conditions (Mahasneh *et al.*, 2023; Chae *et al.*, 2024) [8, 2]. The maintenance of normal faecal scores in the yeast-supplemented group suggests that yeast metabolites supported efficient digestion and rumen stability without substantially altering manure consistency. Similar observations have been reported in previous studies where yeast supplementation improved rumen function and productive performance while maintaining normal faecal characteristics.

Neem leaf supplementation also failed to produce significant changes in faecal condition score. Neem contains several biologically active compounds, including azadirachtin, flavonoids, tannins, and other phytochemicals possessing antimicrobial, antioxidant, and immunomodulatory properties (Patra and Saxena, 2009; Patra, 2012) [11, 10]. These compounds may influence rumen microbial populations and nutrient utilization; however, their effect on manure consistency appears limited under normal feeding conditions. The lack of significant variation in faecal score observed in the present study indicates that neem supplementation maintained normal digestive activity and gastrointestinal function. Similar findings have been reported for several phytogetic feed additives, where improvements in rumen fermentation and nutrient utilization occurred without measurable changes in faecal consistency or manure characteristics (Windisch *et al.*, 2008; Patra, 2012) [19, 11].

Overall, the results of the present study indicate that supplementation of monensin sodium, yeast metabolites, and neem leaf maintained faecal scores within the normal physiological range throughout the experimental period. The absence of significant differences among treatments suggests that these feed additives supported normal rumen function and digestive health without adversely affecting manure consistency in lactating Sahiwal cows.

## Conclusion

The present study demonstrated that dietary supplementation of monensin sodium, yeast metabolites, and neem (*Azadirachta indica*) leaf had no significant effect ( $p > 0.05$ ) on the faecal condition score of lactating Sahiwal cows. Faecal scores remained within a narrow range (3.17–3.83) and were maintained within the normal physiological limits throughout the 90-day experimental period, indicating stable rumen fermentation and normal digestive function. Neither treatment nor period exerted a significant influence on faecal consistency, suggesting that supplementation with monensin sodium, yeast metabolites, and neem leaf did not adversely affect gastrointestinal health or digestive efficiency. The findings indicate that these feed additives can be safely incorporated into the diets of lactating Sahiwal cows without causing undesirable changes in faecal characteristics.

## Acknowledgments

The authors are thankful to the Dean, College of Veterinary Science and Animal Husbandry, Anjora, Durg, for providing facilities to conduct this research.

## References

1. Adhana M, Lathwal SS, Singh P, Devi I, Baithalu RK, Kumar A. The effect of a herbal anthelmintic (garlic and neem) on the production performance of Karan Fries cows. *Vet Arh.* 2023;93(2):159-168.
2. Chae JB, Schoofs AD, McGill JL. Beneficial effects of *Saccharomyces cerevisiae* fermentation postbiotic products on calf and cow health and plausible mechanisms of action. *Front Anim Sci.* 2024;5:1491970.
3. Chaucheyras-Durand F, Walker ND, Bach A. Effects of active dry yeasts on the rumen microbial ecosystem: Past, present and future. *Anim Feed Sci Technol.* 2008;145:5-26.

4. Desnoyers M, Giger-Reverdin S, Bertin G, Duvaux-Ponter C, Sauvant D. Meta-analysis of the influence of *Saccharomyces cerevisiae* supplementation on ruminal parameters and milk production of ruminants. *J Dairy Sci.* 2009;92:1620-1632.
5. Duffield TF, Rabiee AR, Lean IJ. A meta-analysis of the impact of monensin in lactating dairy cattle. *J Dairy Sci.* 2008;91:1334-1346.
6. Horst EA, Kvidera SK, Hagerty S, French PD, Carlson DB, Dhuyvetter K, Holloway AW. Effect of monensin on milk production efficiency and milk composition in lactating dairy cows fed modern diets. *J Dairy Sci.* 2024;107:1441-1449.
7. Kudom AA, Mensah BA, Botchey MA. Aqueous neem extract and neem powder as eco-friendly tools for vector control. *Parasit Vectors.* 2011;4:47.
8. Mahasneh OK, Abdelqader AM, Al-Fataftah AR. Effect of yeast cell wall on gut health, immunity and milk production of dairy cattle under normal and heat stress conditions. *Jordan J Agric Sci.* 2023;19(3):281-299.
9. McGuffey RK, Richardson LF, Wilkinson JID. Ionophores for dairy cattle: Current status and future outlook. *J Dairy Sci.* 2001;84(E Suppl.):E194-E203.
10. Patra AK. The use of phytogenic feed additives in ruminant nutrition. *J Anim Physiol Anim Nutr.* 2012;96:761-774.
11. Patra AK, Saxena J. Dietary phytochemicals as rumen modifiers: A review of the effects on microbial populations. *Phytochemistry.* 2009;70:1198-1222.
12. Petrovski KR, Cusack PMV, Malmo J, Cockcroft PD. The value of “cow signs” in the assessment of the quality of nutrition on dairy farms. *Animals.* 2022;12:1352.
13. Raj K, Kaur H, Singh M. Utilization of neem-based feed resources in dairy cattle nutrition: A review. *Indian J Anim Nutr.* 2016;33(2):115-122.
14. Ramesh B, Saravanan M, Muralidharan P. Pharmacological activities of *Azadirachta indica*: A review. *Int J Pharm Sci Rev Res.* 2011;9(1):45-49.
15. Robinson PH. Impacts of feeding monensin sodium on production and the efficiency of milk production in dairy cows fed total mixed rations: Evaluation of a confounded literature. *Can J Anim Sci.* 2020;100:391-401.
16. Russell JB, Strobel HJ. Effect of ionophores on ruminal fermentation. *Appl Environ Microbiol.* 1989;55:1-6.
17. Skidmore AL, Stokes MR, Chapa AM. Development and use of a fecal scoring system for dairy cattle. In: *Proceedings of the Cornell Nutrition Conference for Feed Manufacturers.* Ithaca, New York, USA: Cornell University; 1996. p. 1-8.
18. Snedecor GW, Cochran WG. *Statistical Methods.* 8th ed. Ames, Iowa, USA: Iowa State University Press; 1994.
19. Windisch W, Schedle K, Plitzner C, Kroismayr A. Use of phytogenic products as feed additives for swine and poultry. *J Anim Sci.* 2008;86(E Suppl.):E140-E148.